CLAIMS

1. A DNA encoding a protein consisting of an amino acid sequence shown in SEQ ID NO: 1, or a protein variant consisting of an amino acid sequence containing substitution, deletion, and/or addition of one or more amino acid residues of SEQ ID NO: 1, provided that the protein and the protein variant give rise to tumor antigen peptides that are capable of binding to an HLA antigen and being recognized by cytotoxic T lymphocytes.

2. A DNA consisting of a base sequence shown in SEQ ID NO: 2, or a DNA variant that hybridizes to the DNA under a stringent condition, provided that a protein produced and expressed by the DNA or the DNA variant gives rise to tumor antigen peptides that are capable of binding to an HLA antigen and being recognized by cytotoxic T lymphocytes.

3. An expression plasmid that contains the DNA of claim 1 or 2.

4. A transformant that is transformed with the expression plasmid of claim 3.

5. A process for producing a recombinant protein, which comprises culturing the transformant of claim 4, and recovering the expressed recombinant protein.

6. A tumor antigen protein that is encoded by the DNA of claim 1 or 2, or is produced by the process of claim 5.

7. A pharmaceutical composition that comprises as an active ingredient the DNA of claim 1 or 2, or the protein of claim 6.

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8. A pharmaceutical composition for treating or preventing tumors, which comprises as an active ingredient the DNA of claim 1 or 2, or the protein of claim 6.

9. A tumor antigen peptide that is a partial peptide derived from the protein of claim 6, and that is capable of binding to an HLA antigen and being recognized by cytotoxic T lymphocytes, or a derivative thereof having the functionally equivalent properties.

10. The tumor antigen peptide of claim 9 wherein the HLA antigen is HLA-A24 or HLA-A2, or a derivative thereof having the functionally equivalent properties.

11. The tumor antigen peptide of claim 10, which comprises a sequence selected from all or part of an amino acid sequence shown in any one of SEQ ID NOs: 3-52, or a derivative thereof having the functionally equivalent properties.

12. The tumor antigen peptide of ~~claim~~ 11, which comprises a sequence selected from all or part of an amino acid sequence shown in any one of SEQ ID NOs: 3-9 and 25-29, or a derivative thereof having the functionally equivalent properties.

13. The tumor antigen peptide derivative of claim 11, which comprises a sequence selected from all or part of an amino acid sequence wherein the amino acid residue at position 2 and/or the C-terminus in the amino acid sequence shown in any one of SEQ ID NOs: 3-52 is substituted by another amino acid residue.

14. The tumor antigen peptide derivative of claim 13, which comprises a sequence selected from all or part of an amino acid sequence wherein the amino acid residue at position 2 and/or the C-

terminus in the amino acid sequence shown in any one of SEQ ID NOs: 3-9 and 25-29 is substituted by another amino acid residue.

15. The tumor antigen peptide derivative of claim 13, which comprises a sequence selected from all or part of an amino acid sequence wherein the amino acid residue at position 2 in the amino acid sequence shown in any one of SEQ ID NOs: 3-24 is substituted by tyrosine, phenylalanine, methionine, or tryptophan, and/or the amino acid residue at the C-terminus is substituted by phenylalanine, leucine, isoleucine, tryptophan, or methionine.

16. The tumor antigen peptide derivative of claim 13, which comprises a sequence selected from all or part of an amino acid sequence wherein the amino acid residue at position 2 in the amino acid sequence shown in any one of SEQ ID NOs: 25-52 is substituted by leucine, methionine, valine, isoleucine, or glutamine, and/or the amino acid residue at the C-terminus is substituted by valine or leucine.

17. The tumor antigen peptide derivative of claim 14, which comprises a sequence selected from all or part of the amino acid sequence shown in any one of SEQ ID NOs: 53-64.

18. A pharmaceutical composition for treating or preventing tumors, which comprises as an active ingredient at least one of substances selected from the tumor antigen peptides and derivatives thereof according to ~~any one of claims 9 to 17~~ claim 9.

19. A recombinant DNA comprising at least one of DNAs that encode the tumor antigen peptides or derivatives thereof according to ~~any one of claims 9 to 17~~ claim 9.

20. A recombinant polypeptide obtainable by expressing the recombinant DNA of claim 19.

21. A pharmaceutical composition for treating or preventing tumors, which comprises as an active ingredient the recombinant DNA of claim 19 or the recombinant polypeptide of claim 20.

22. An antibody that specifically binds to any one of the tumor antigen protein of claim 6, and the tumor antigen peptide or the derivative thereof according to any one of claims 9 to 17.

23. An antigen-presenting cell wherein a complex between an HLA antigen and the tumor antigen peptide or the derivative thereof according to ~~any one of claims 9 to 17~~ claim 9 is presented on the surface of a cell having antigen-presenting ability, which cell is isolated from a tumor patient.

24. An antigen-presenting cell on which a complex between an HLA antigen and a tumor antigen peptide or a derivative thereof is presented, said antigen-presenting cell being obtainable by allowing a cell having antigen-presenting ability isolated from a tumor patient to be incorporated with the DNA of claim 1 or 2, the tumor antigen protein of claim 6, the recombinant DNA of claim 19, or the recombinant polypeptide of claim 20.

25. A pharmaceutical composition for treating tumors, which comprises as an active ingredient the antigen-presenting cell of claim 23 ~~or 24~~.

26. A cytotoxic T lymphocyte that specifically recognizes a complex between an HLA antigen and the tumor antigen peptide or derivative thereof according to ~~any one of claims 9 to 17~~ claim 9.

27. A cytotoxic T lymphocyte that specifically recognizes a complex between an HLA antigen and a tumor antigen peptide or derivative thereof, which complex is presented on the antigen-presenting cell of claim 23 ~~or 24~~.

28. A pharmaceutical composition for treating tumors, which comprises as an active ingredient the cytotoxic T lymphocyte of claim 26 ~~or 27~~.

29. A diagnostic agent for tumors, which comprises the tumor antigen peptide or derivative thereof according to any one of claims 9 to 17, the protein of claim 6, or the recombinant polypeptide of claim 20.

30. Cytotoxic T lymphocyte OK-CTL, of which the deposit number is FERM BP-6818.

31. A method for identifying tumor antigen proteins or tumor antigen peptides, which comprises using OK-CTL of claim 30.

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